Alabama Water Watch –

working for cleaner water in our communities

Eric Reutebuch
Alabama Water Watch

ADEM NPS Conference
January 15, 2015
Montgomery, Alabama

AUBURN UNIVERSITY
ALABAMA AGRICULTURAL EXPERIMENT STATION
WATER RESOURCES CENTER

Alabama Water Watch

extension
ALABAMA A&M & AUBURN UNIVERSITIES

Alabama Water Watch –

working for cleaner water in our communities

- Background – a long history of ADEM collaboration
- Are the data credible?
- So what , where's the beef!

Humble Beginnings

Alabama Water Watch

Community-Based Watershed Stewardship through Citizen Volunteer Monitoring of Alabama's Lakes, Streams and Coasts

Alabama Water Watch

From Science-Based Data to Community Action

Get Certified

Collect water data with hundreds of other monitors using simple and accurate methods backed by U.S. EPA-approved quality assurance plans.

Put Your Data into Action

Work together to use water quality information to protect and restore waterbodies, raise awareness of watershed issues, improve environmental education in classrooms, and advocate improved water policies.

Share Your Experience

Tell others about the challenges and successes in your watershed to inform and motivate monitors, policy makers and the general public. Statewide success stories are featured on the AWW website.

Support AWW

Contribute your experiences, services, membership dues and gifts to ensure that AWW will continue to educate, train and empower citizens through community-based watershed stewardship for years to come.

Water Chemistry Monitoring

Conduct simple chemistry tests, such as dissolved oxygen and pH, to assess pollution.

Bacteriological Monitoring

Test for waterborne pathogens, including *E. coli* and other coliform bacteria.

Stream Biomonitoring

Survey macroinvertebrates or "aquatic bugs" to determine stream health.

Restoration and Protection

A group of citizen scientists is using AWW monitoring techniques in efforts to protect an endangered darter in the Clear Creek Watershed, a tributary of Smith Lake. AWW monitors are also actively involved in watershed management plans for restoration and long-term protection of water quality throughout the state.

The Rush Darter, *Etheostoma phytophilum*, is one of the most endangered fishes in Alabama.

Environmental Education

AWW data and test kits have been successfully used by educators to teach about water, conduct science projects, and enable children to monitor local streams. Many teachers and classes have won local and statewide awards for this work. AWW has developed an aquatic science curriculum endorsed by the Alabama Math, Science and Technology Initiative that is used by scores of teachers statewide.

The Radney Elementary gifted class (Alexander City) won the 2012 Best Environmental Education Program (BEEP) Award using AWW monitoring techniques.

Advocacy and Water Policy

AWW groups have used their long-term data and intimate knowledge of their waterbodies to make cases for greater legal protection by the state. Groups on Wolf Bay and the Magnolia River advocated and achieved the highest state classification for their waterbodies, Outstanding Alabama Water. The AWW group on Lake Martin was influential in getting the Treasured Alabama Lake designation.

The Governor of Alabama signing an Executive Order to create Treasured Alabama Lake designation.

Alabama's Watersheds

1. Tennessee
2. Tombigbee
3. Black Warrior
4. Cahaba
5. Coosa
6. Tallapoosa
7. Alabama
8. Coastal Plain Streams
9. Chattahoochee
10. Mobile

Visit our website at **alabamawaterwatch.org**

Alabama Water Watch

Yeehaa! R & R Here I Come!

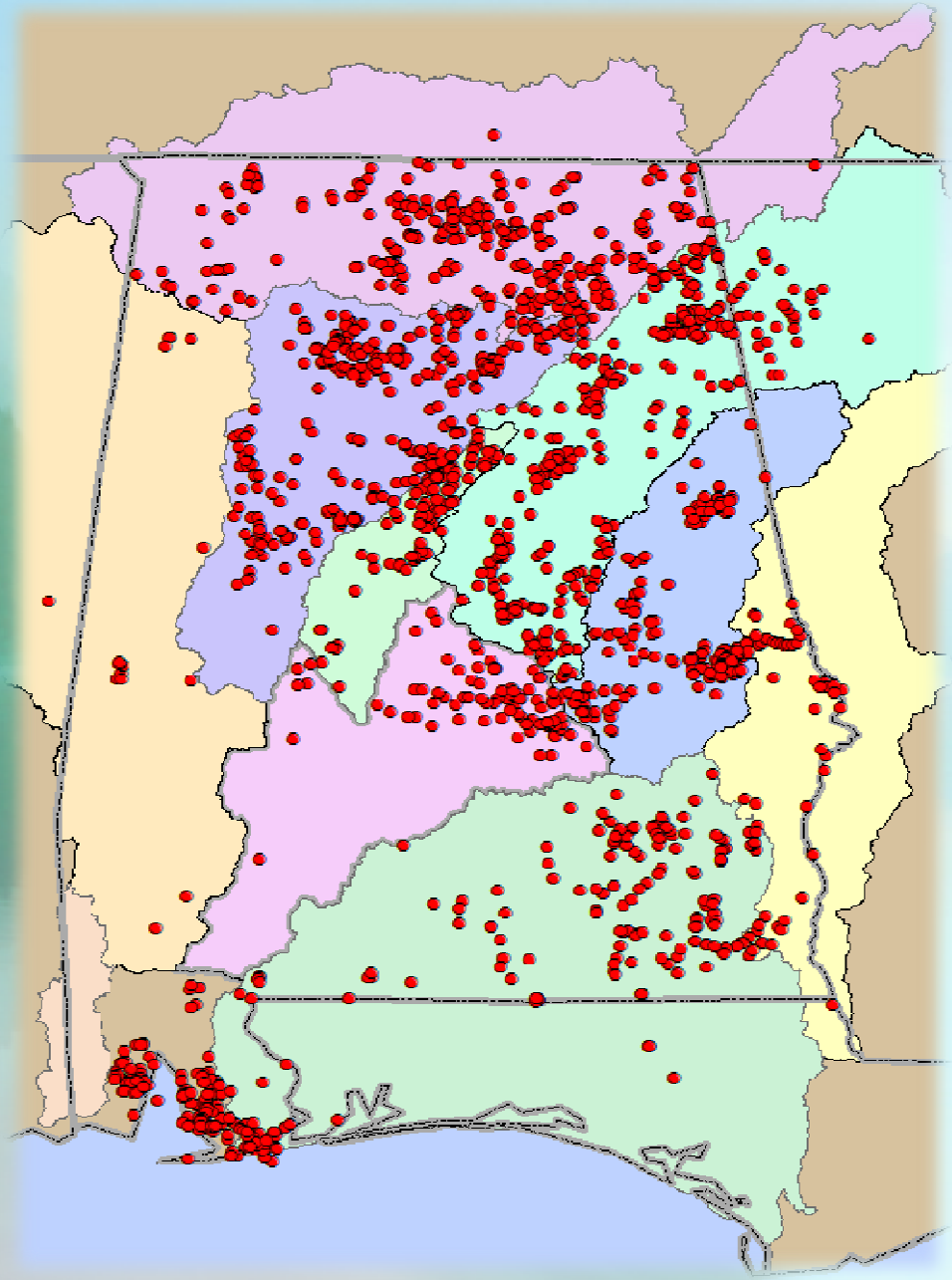
Our New Home!

AUBURN UNIVERSITY
ALABAMA AGRICULTURAL EXPERIMENT STATION
WATER RESOURCES CENTER

extension
ALABAMA A&M & AUBURN UNIVERSITIES

AUBURN UNIVERSITY
ALABAMA AGRICULTURAL EXPERIMENT STATION

AWW – Alive and Well!



Cumulative 1993 - 2014

- 78,900 Water Quality Records
- 6,450 Certified Monitors
- 2,270 Sites
- 280 Citizen Groups
- 40 Active Citizen Trainers
- 1,860 Workshops

A Long History of Collaboration – In the creek

A Long History of Collaboration – on the lake

A Long History of Collaboration – at the Sop

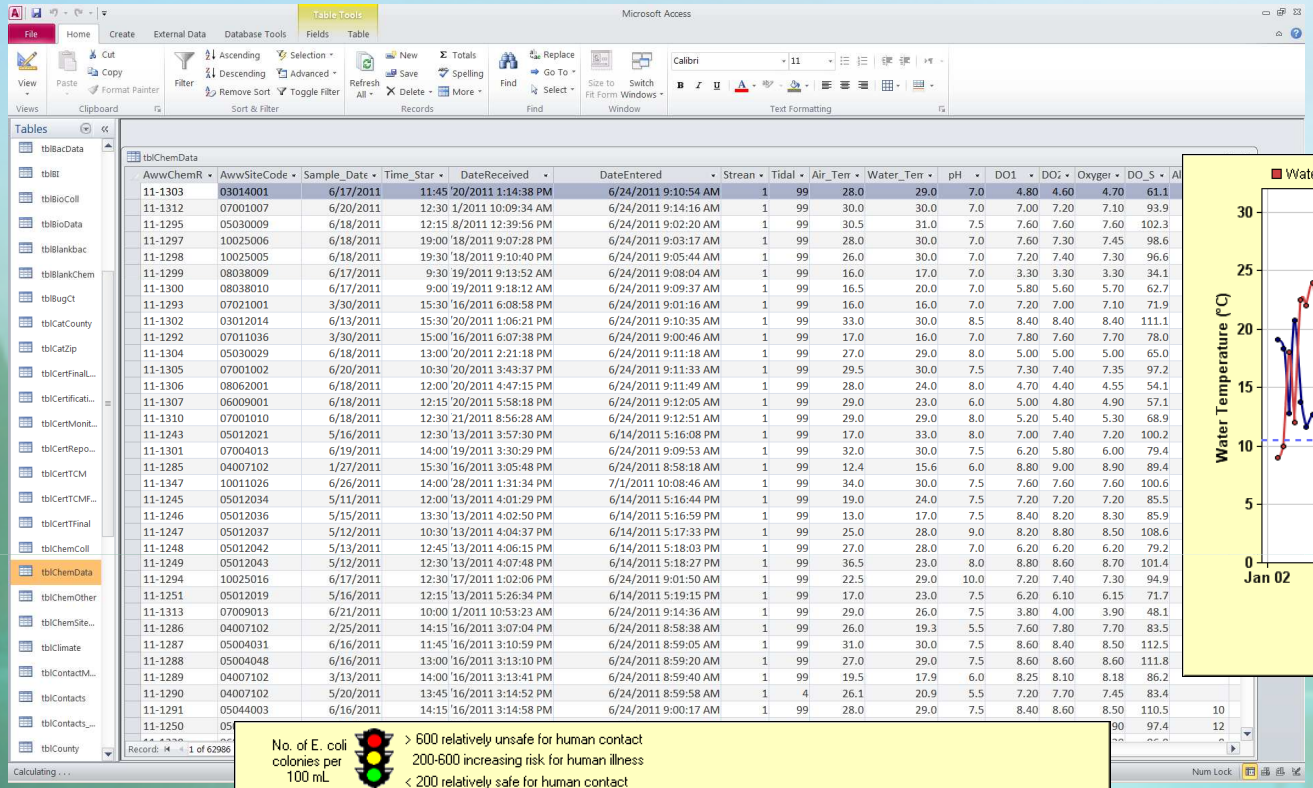
A Long History of Collaboration – at the conference

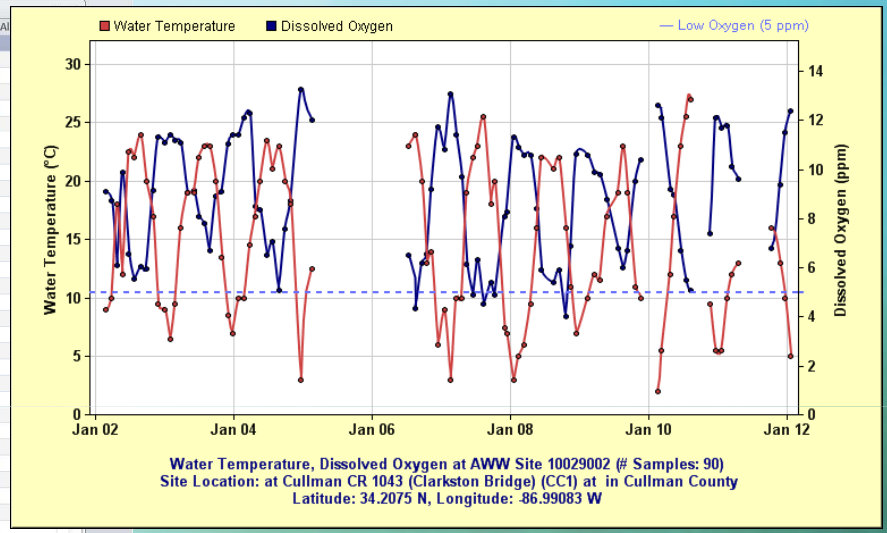
www.aaes.auburn.edu/water/projects/TallapoosaBasinConference.php

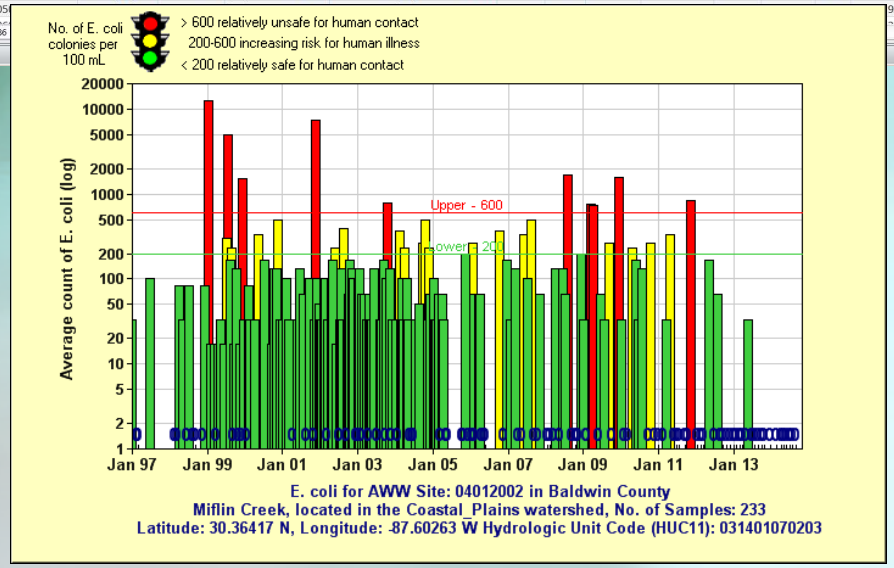
A Long History of Collaboration – at the Harbor

A Long History of Collaboration – with Others Too

Are the Data Credible?

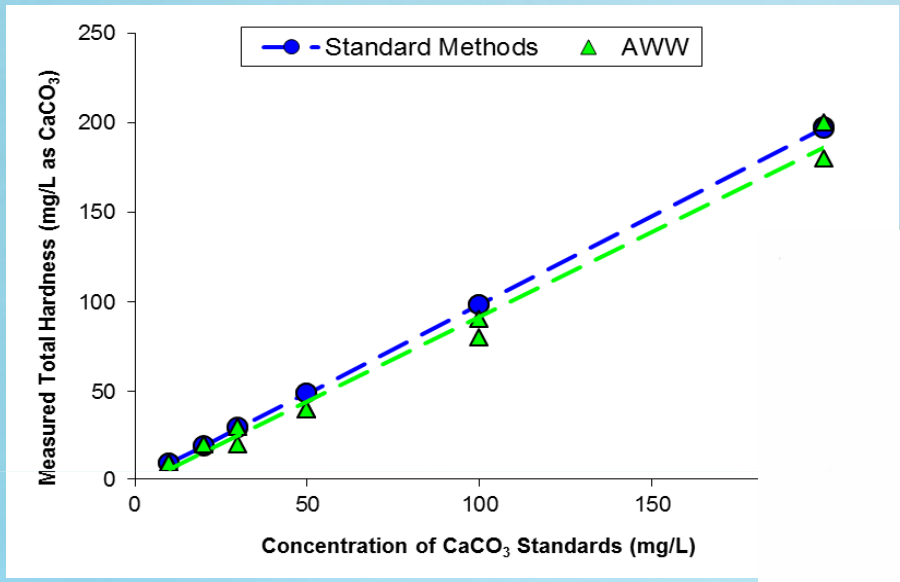






EPA-Approval

(involves a lot of QUAPP)



WATER CHEMISTRY QUALITY ASSURANCE PLAN
(Revision of the Quality Assurance Plan Approved June, 1994)

For

Alabama Water Watch

A Program dedicated to developing Citizen Volunteer Monitoring of Alabama's Lakes, Streams and Coasts
Funded in part by a grant from the U.S. EPA, Region 4
Clean Water Act, Section 319
And the Alabama Department of Environmental Management

Prepared for
U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 4

January 23, 2004

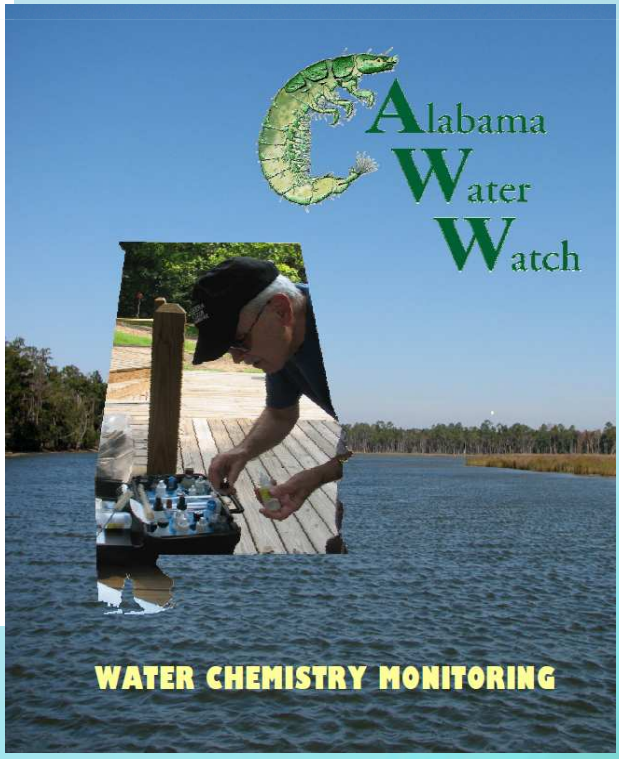
APPROVALS

Ronald E. Estridge — 1/23/04
Ronald E. Estridge, M.S., Data Quality Coordinator — Date

William G. Deutsch — 1/23/04
William G. Deutsch, Ph.D., AWW Program Manager — Date

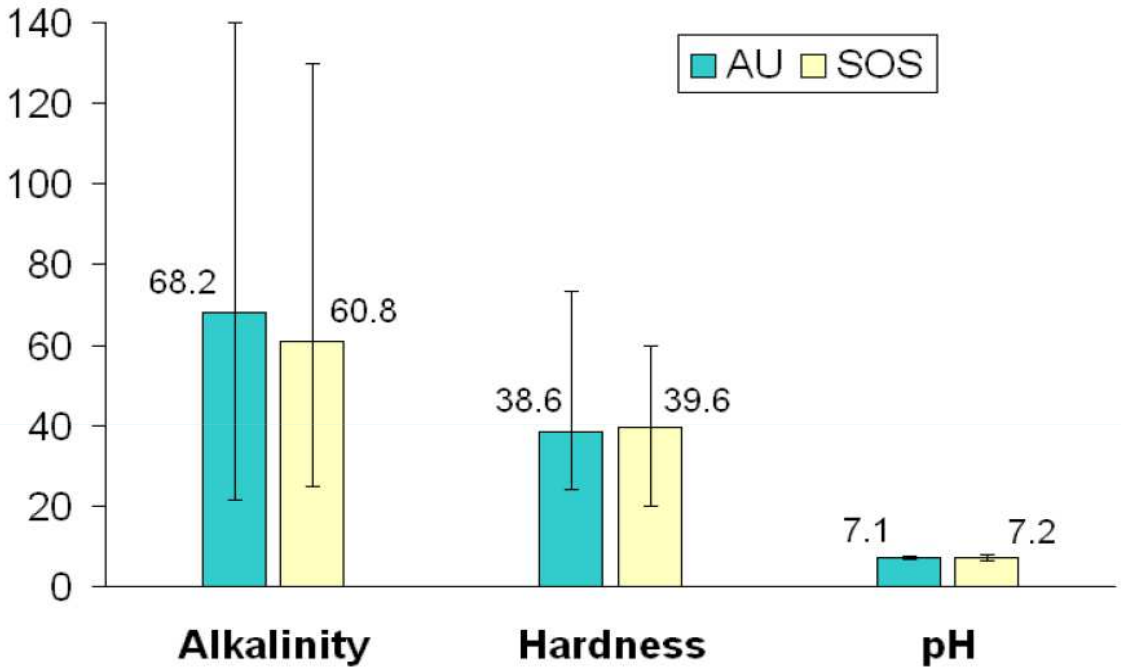
Norman Blakey — 1/26/04
Norman Blakey, ADEM Project Director — Date

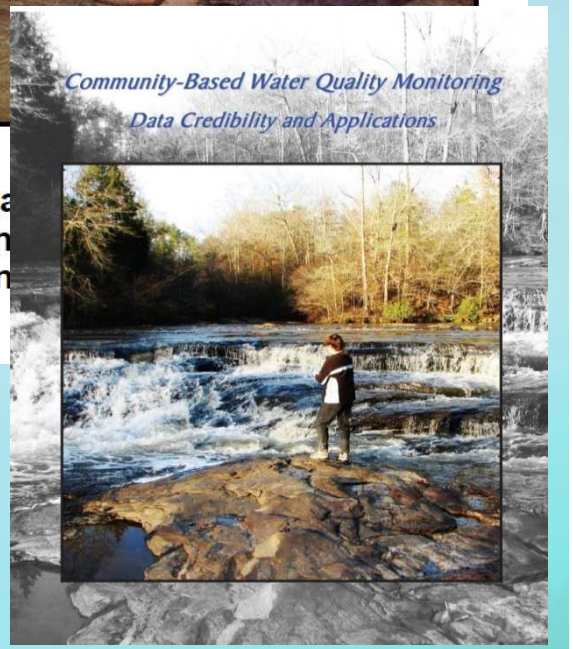
Marilyn Thornton — March 9, 2004
Marilyn Thornton, U.S. EPA Region 4, Quality Assurance Manager — Date



www.alabamawaterwatch.org/resources/publications.html

Data Credibility – in the Field

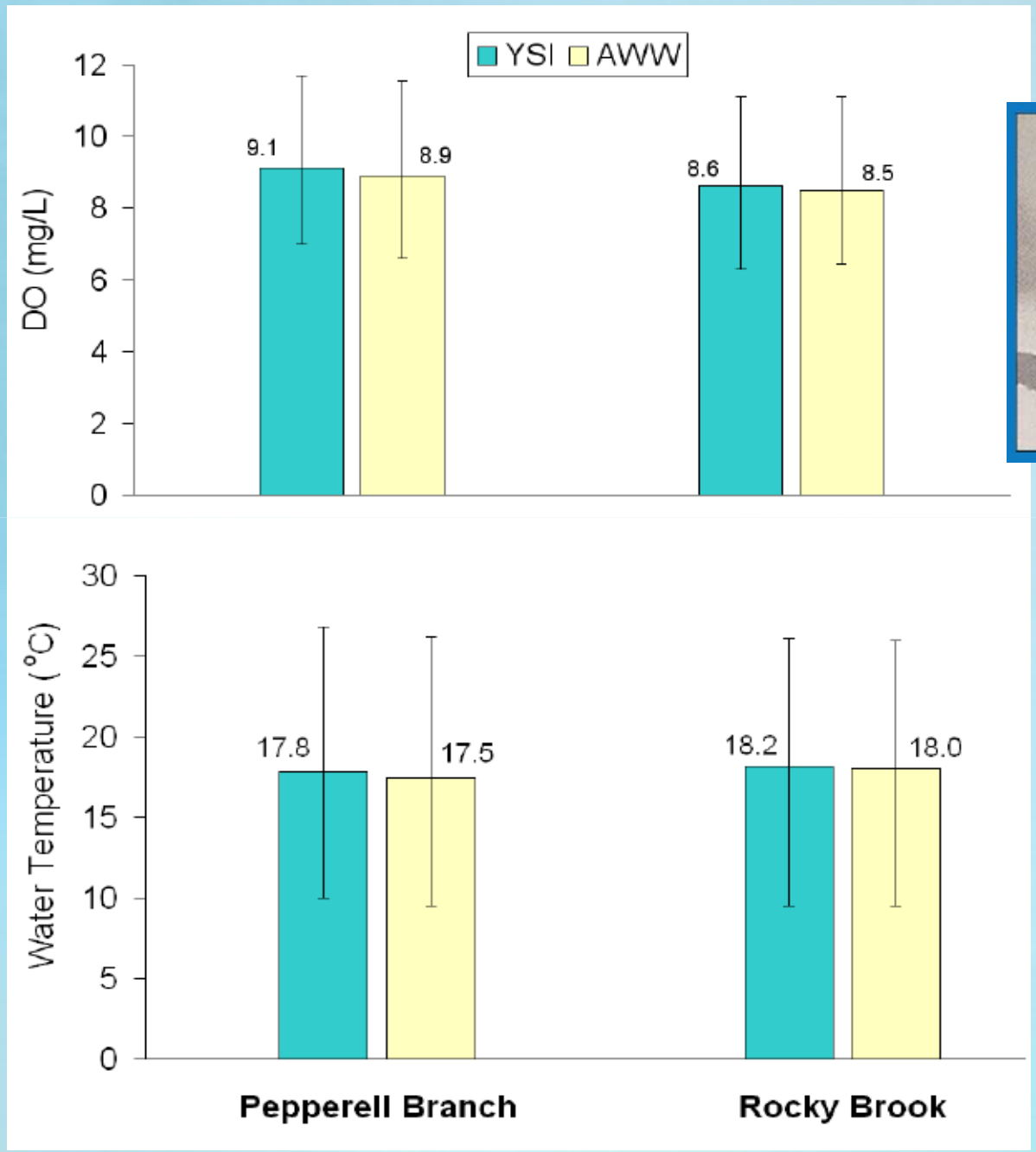


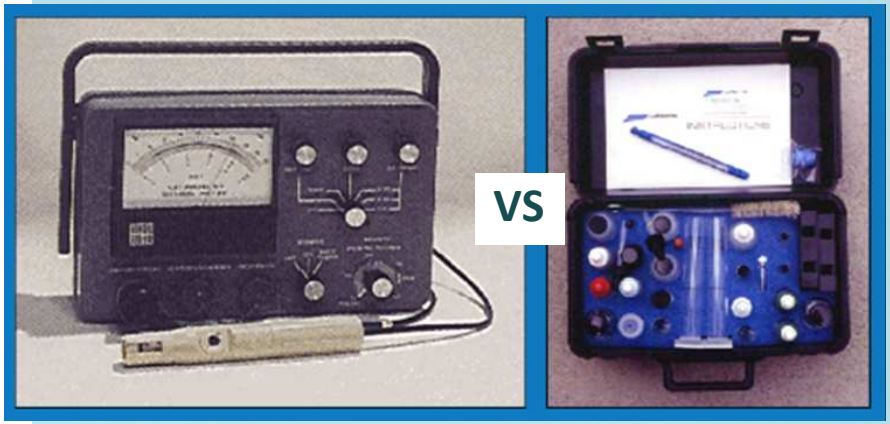


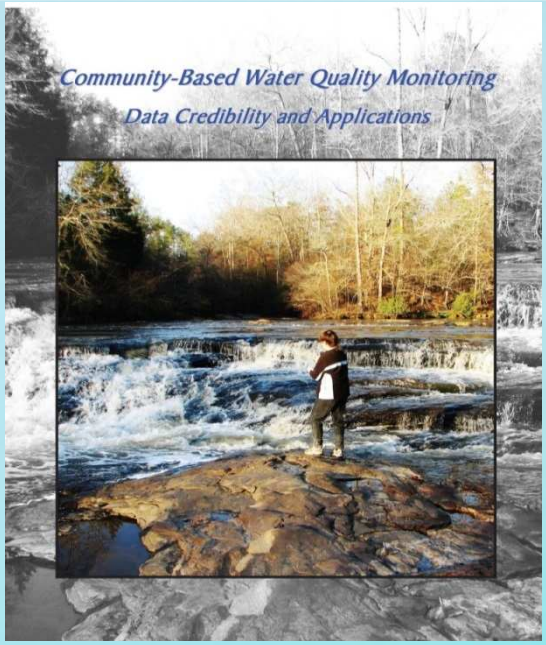
Average alkalinity, hardness and pH measured by AU researchers (turquoise bars) a (yellow bars) at Lee County Road 188 Bridge near Loachapoka, Alabama. Measuremen months from 2/2005-1/2007. Vertical lines on bars represent range of values (min monitors Tom Ivers and Todd Miller (above) sample the creek at this site.

www.alabamawaterwatch.org/resources/publications.html

Data Credibility – in the Field



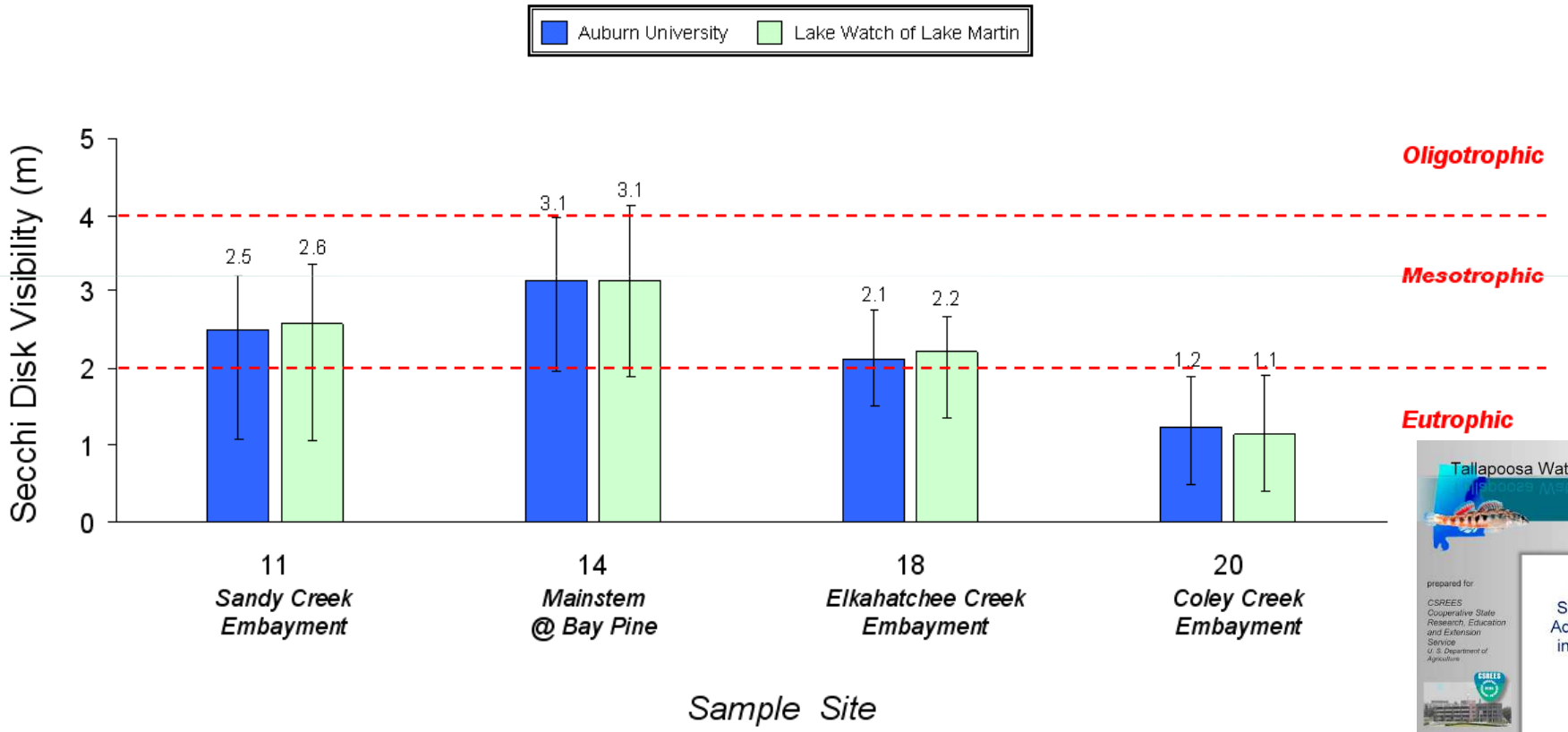


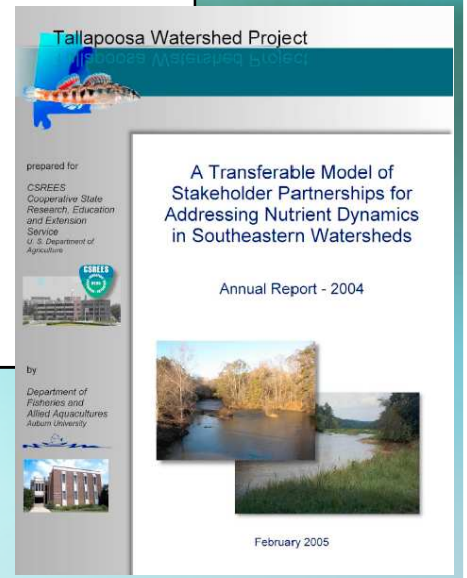


www.alabamawaterwatch.org/resources/publications.html

Secchi Disk Visibility - LAKE MARTIN

AU vs. LWLM, April-October 2004





www.alabamawaterwatch.org/tallapoosa-watershed-project.html


BIG BUN
"WHERE'S THE BEER?"

So, Who Uses AWW Data?

- Local community groups
- Schools
- Consulting firms
- Municipalities
- County agencies
- Watershed management plans
- Universities
- State agencies

Environmental Ed

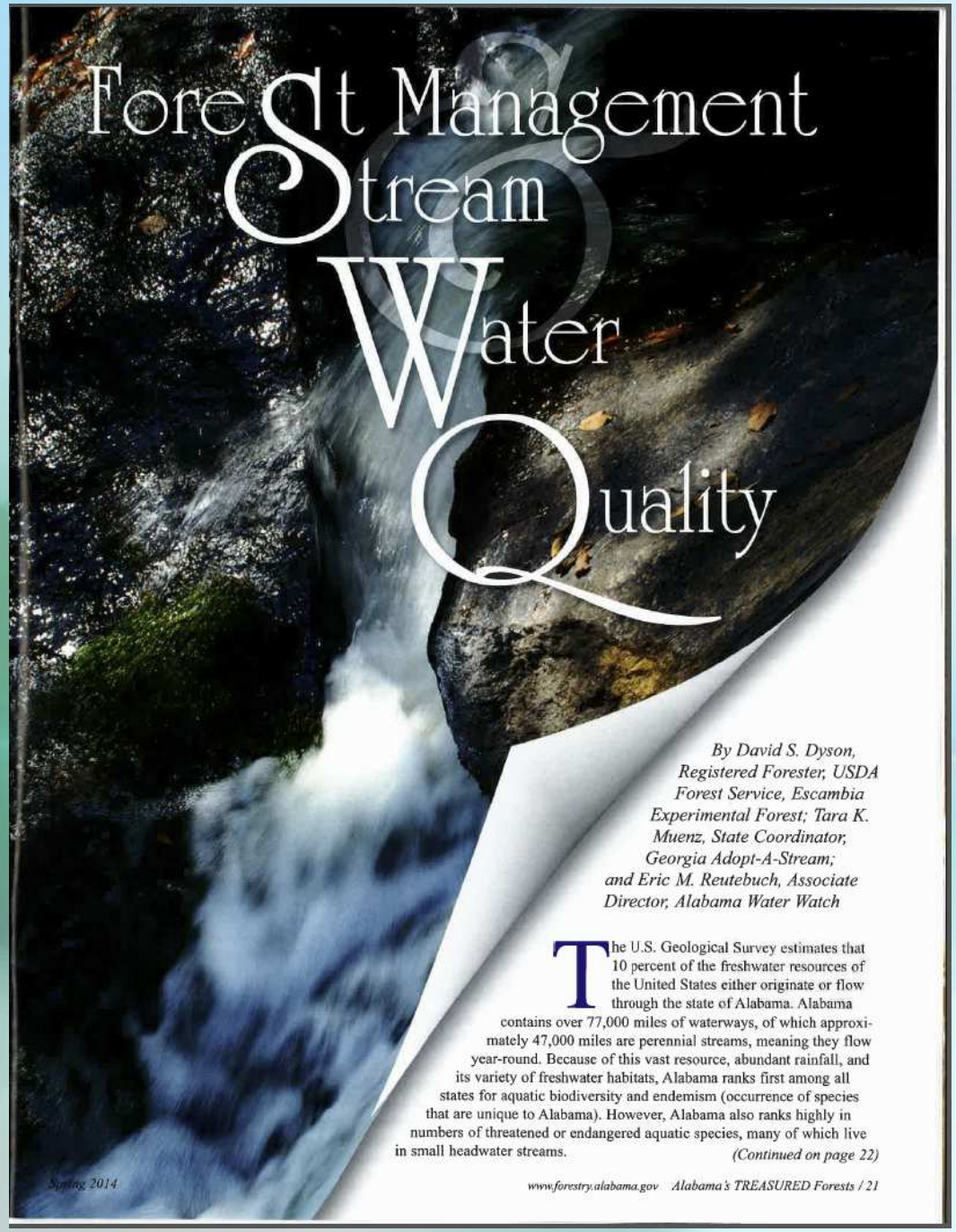
Stormwater Management Plans

(to fulfill NPDES Phase II Stormwater Regs)

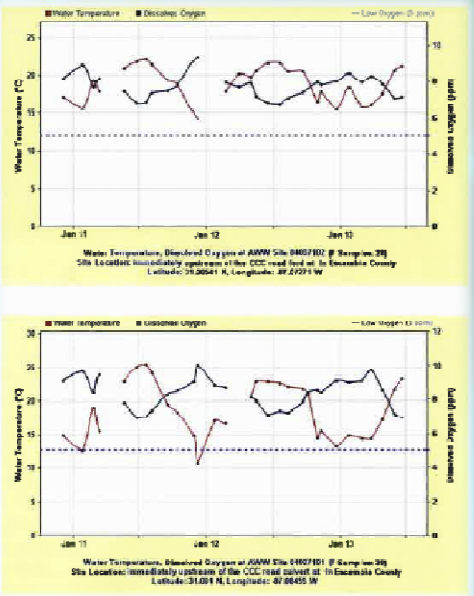
I. Streamside Classroom Initiative

In an effort to educate and raise awareness in our community about the need to protect local streams, the City of Auburn, ALOAS (citizen stormwater advisory committee), Save Our Saugahatchee (S.O.S.) and Auburn City Schools have joined together to provide streamside classroom activities. This past year's event was held May 2 – 3, 2012 along Swingle Creek in Auburn. Students from local middle schools combine classroom instruction with hands on field activities to conduct water chemistry and a biological assessment of a local stream. The program, geared to sixth graders, focuses on providing students with a background in the type of habitat expected to sustain a healthy stream. The students conduct a chemical analysis of the stream and compare the results with that of a biological assessment of the same stream. The City of Auburn participates by providing funding for transportation of the students to and from the stream site as well as for having appropriate restroom facilities on site.

City of Auburn



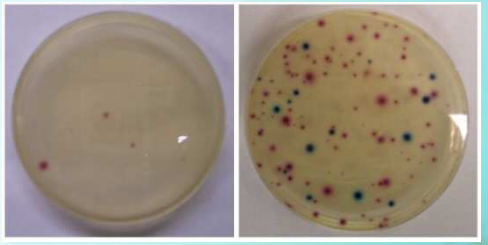
Monitoring surface water conditions is vital to ensuring the health of aquatic ecosystems and providing safe drinking water.

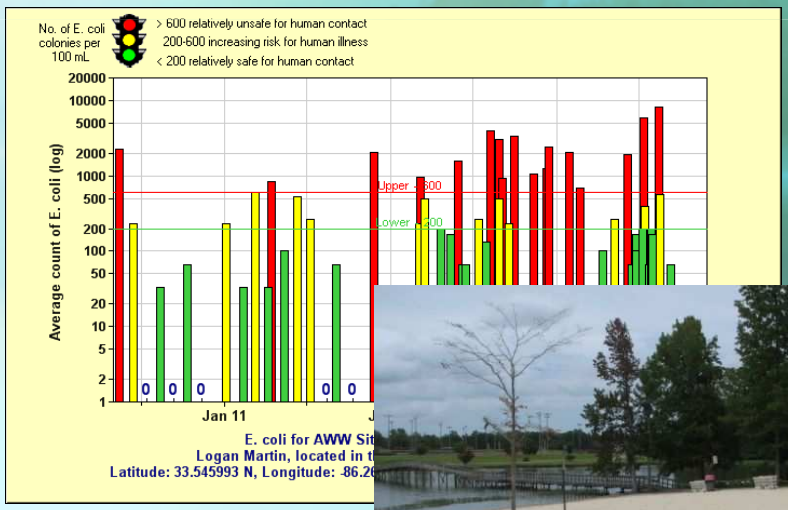


Figures 2 & 3 - Temperature and dissolved oxygen data from South Fork and Red Branch exhibit the classic inverse relationship of healthy streams.

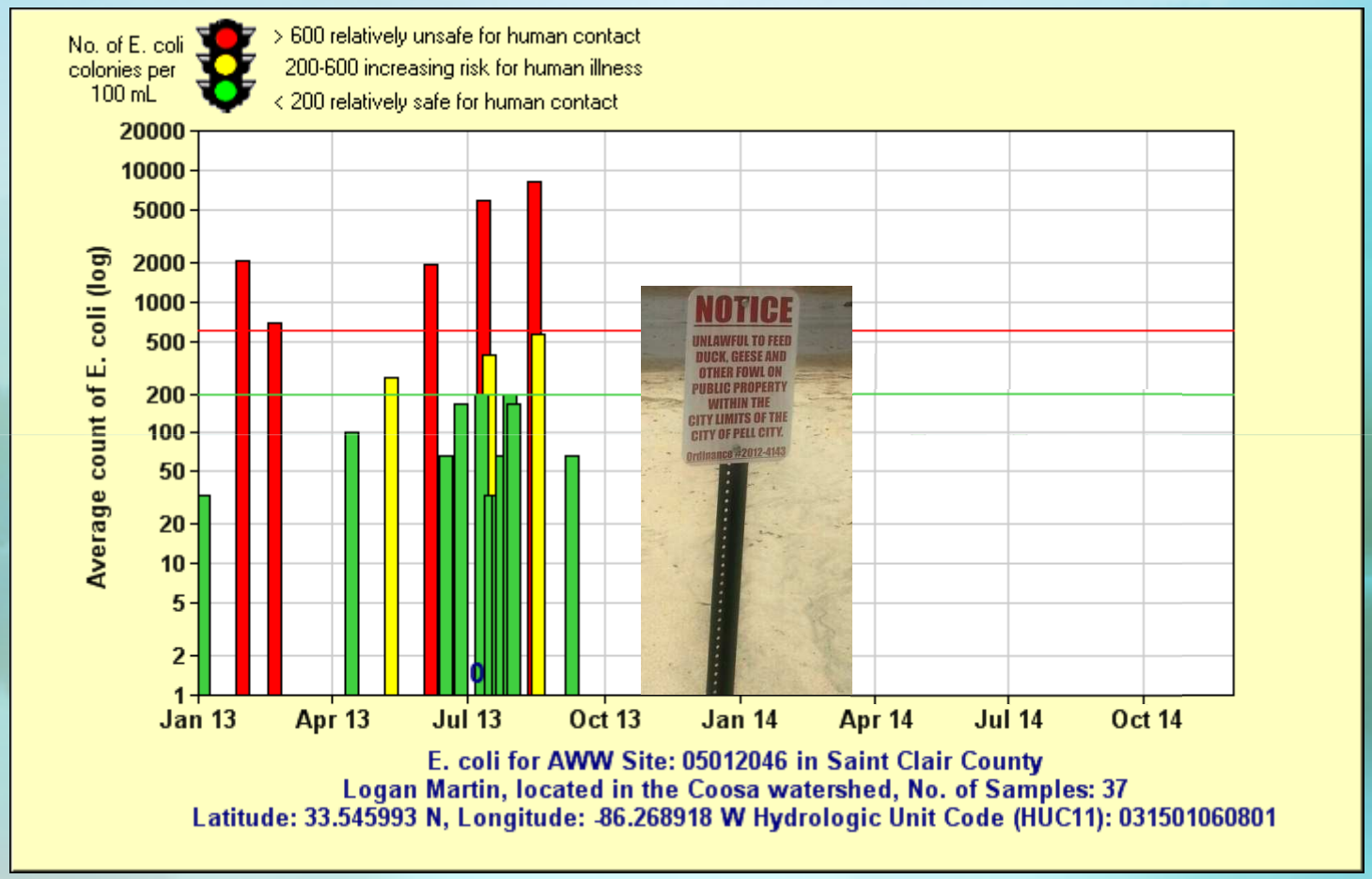
http://wp.auburn.edu/aww/aww-teams-up-with-gaa-and-the-forest-service-to-protect-streams

LMLPA – Putting Their Data to Work

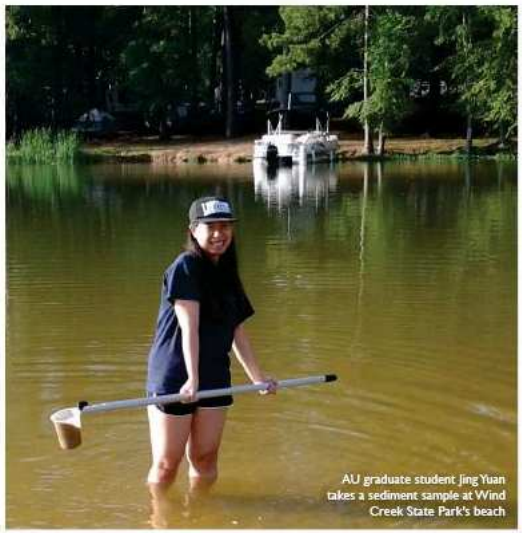




LMLPA – Putting Their Data to Work



http://wp.auburn.edu/aww/lmlpa-cuts-through-the-crap



AU graduate student Jing Yuan takes a sediment sample at Wind Creek State Park's beach

AWW Director Eric Reutebuch tests samples for E. coli bacteria

Lake Martin added to swim guide site

Extensive Auburn University study affords 100 percent rating for Wind Creek State Park Beach

STORY BY BETSY ILER
PHOTOS & GRAPH COURTESY OF AU WATER RESOURCES CENTER

Lake Martin's Wind Creek State Park Beach last month joined theswimguide.org website with a 100 percent rating as one of a handful of clean freshwater swimming beaches in the interior of Alabama. The post came after several months of vigorous chemical and bacterial water sample tests conducted through the Auburn University Alabama Water Watch (AWW) office in the AU Water Resources Center and local Lake Watch volunteers.

AWW Director Eric Reutebuch posted the results of the six-month testing program in mid-December, noting that bacterial levels remained well below harmful levels throughout the testing.

"Every time we sampled, the levels were well below the limit for E. coli," Reutebuch noted. "It was always well within the safe zone for human contact."

Levels under 200 E. coli colonies per 100 milliliters are deemed safe by AWW, with Alabama's Department of Environmental Management criteria at 235 E. coli colonies per 100 milliliters of lake water.

The samples taken from Lake Martin were never higher than 33 colonies per 100 milliliters, Reutebuch said.

The study was funded by the U.S. Geological Society through the Water Resources Research Institute. Research was conducted by Auburn University microbiologist Dr. Luxin Wang and her graduate student Jing Yuan, along with Lake Watch Lake Martin volunteer water quality monitors. Samples were taken from the site two times on one day each month from May through October, and test results can be found online at www.alabamawaterwatch.org.

"Click on water data; then, summary data and bacteria and site histories," Reutebuch said.

"One of the biggest things that came out of the study was getting Lake Martin onto theswimguide site," he added. "The guide lists swimming beaches from all over the U.S., Canada and Mexico. You can click on any site on the map and get a report of the cleanliness of that beach. There's an app for it, too, so you can check it on your smartphone."

In addition to taking water samples in the morning and afternoon, the testing team took sediment samples in the morning on testing days, as recent research has indicated there could be E. coli concentrations below the water, Reutebuch said. The teams dipped up the sediment on the lake floor after taking their morning samples; then, they returned to the site in the afternoon to take additional samples.

"In general, the sediment tested did have higher levels, but again in Lake Martin it was a non-issue. Levels were still substantially lower than limits," Reutebuch reported.

One other lake in Alabama was part of the study; Logan-Martin north of Lake Martin. While some water quality issues were identified there – and preventative actions taken as a direct result – Lake Martin's bacterial counts were never a cause of concern over the course of the testing program, Reutebuch said.

Another objective of the local testing program was to check and validate the procedures and test results of Lake Watch Lake Martin, said Ann Campbell, chair of water quality monitoring at Lake Watch.

"We took samples beside the Auburn testers, and we consistently had the same results," Campbell said.

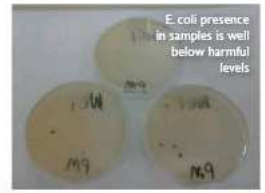
The Lake Watch program this year added six volunteer monitors and nine sites to their program. The non-profit watchdog organization now includes 18 volunteers who take monthly water samples at 23 sites around Lake Martin, including the state park beach.

Lake Watch will continue to test the beach area and will post test results on theswimguide.org site, which also posts information of interest to visitors to the area.

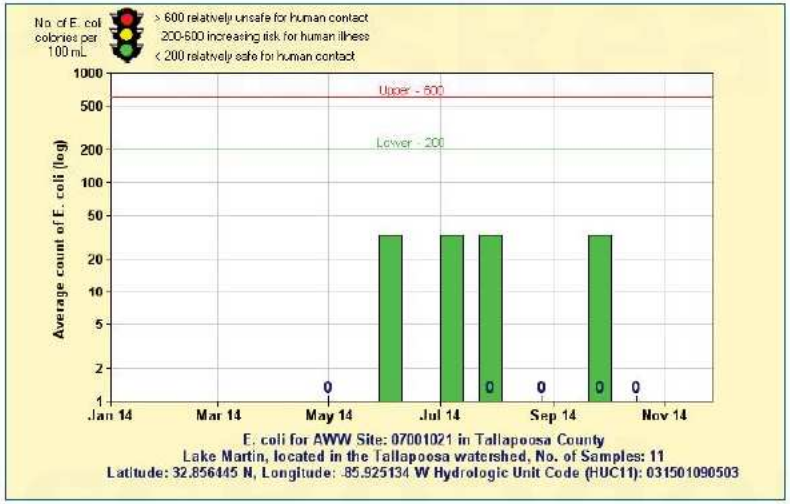
Lake Watch Education Chair Dick Bronson said students in the gifted program at Alexander City's Radney Elementary School also have been sampling and testing water at the state park beach.

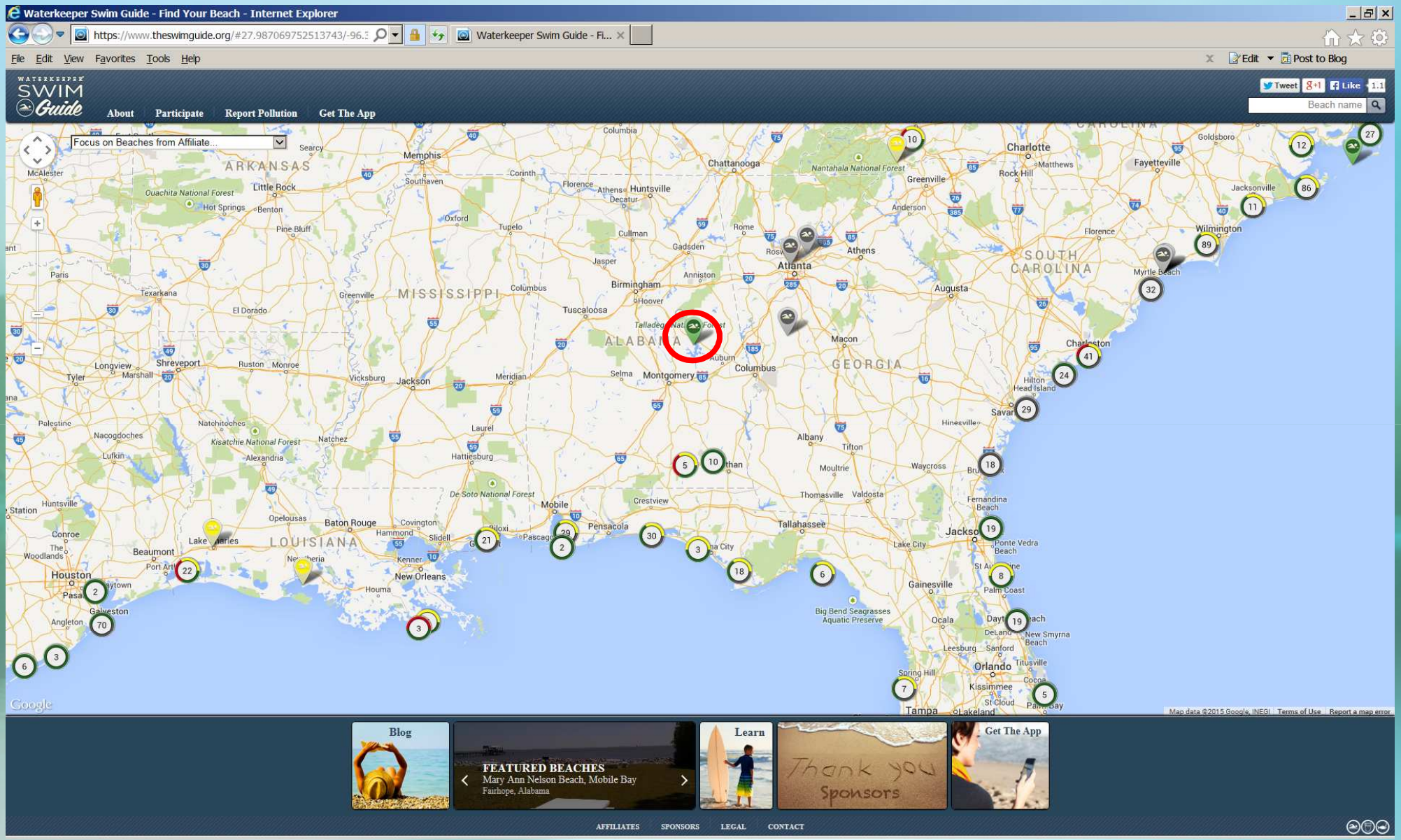
"This swim guide site has given them a practical application for something they have been doing in the classroom for three years. It is meaningful and useful as a public service," Bronson said.

Lake Watch hopes to add the D.A.R.E. Park beach to the program in the future, he added.



E. coli presence in samples is well below harmful levels





www.theswimguide.org

Camping: 626 modern campsites and 16 horse camping sites. Reservations taken Monday - Friday from 8 a.m. - 4 p.m.

Marina: Bait, camping and boating supplies. Hours 8 a.m. - 4 p.m.

Hiking: Two hiking trails, rated moderate to difficult, and one 10-mile horseback riding trail. Overnight horse camping available.

Want more information - simply go to: www.alapark.com/windcreek

SOURCES

The State of Alabama does not routinely monitor inland (freshwater) swimming areas/beaches. Several swimming areas are monitored by Alabama Water Watch volunteer monitors at sites where there is significant recreational use. Monitoring is done using methods (protocols) developed by the AWW Program that have been approved by Region 4 of the U.S. EPA (the EPA-approved AWW bacteriological monitoring plan is available at www.alabamawaterwatch.org/resources/publications.html).

AWW volunteer monitors throughout Alabama continue monitoring sites as long as resources and trained volunteers are available. All bacteriological monitoring data is routinely uploaded to the AWW online database and is available to the public in chart format. To view these data, go to: https://fp.auburn.edu/icaae/index.aspx# , click Summary Data -> Bacteria -> Site Histories.

Several AWW 'success stories' are described at www.alabamawaterwatch.org/successstor.html .

To determine what constitutes safe and unsafe levels of bacterial contamination, AWW volunteer monitors use the criterion established by the AWW Program. This criterion is based on a single sample taken in triplicate (the normal sampling regime for most AWW volunteer monitors) that AWW employs in its Bacteriological Monitoring workshops. This criterion agrees closely with the criterion that ADEM adopted in 2010 (when they switched from a fecal coliform criterion to one based on E. coli), and to the Beach Action Value (BAV) recommended by EPA in 2012 in their publication 'Recreational Water Quality Criteria' (EPA-820-F-12-061).

The AWW criterion for acceptable levels of E. coli in waterbodies that are relatively safe for human contact is:

AWW Criterion: 200 E. coli/100 mL of water
(Note: ADEM Criterion: 235 E. coli/100 mL; EPA BAV: 235 E. coli/100 mL)

A beach is marked GREEN when the single-sample result (average of triplicate readings) indicates a bacteria count of zero to 200 E. coli/100 mL of water.

A beach is marked RED when single-sample results indicate bacteria counts greater than 200 E. coli/100 mL of water.

A beach is marked GREY when reliable information is not available

for it. Always obey signs posted at the beach or advisories from official government agencies.

GRAPHS

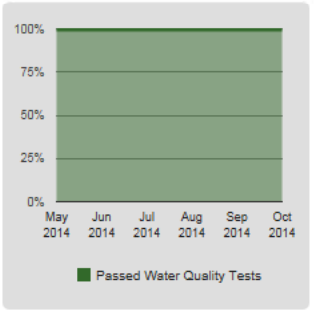


CHART TYPE ○ Pie ◉ Bar
INTERVAL Month

Local Community supports Water Watchers

Save Our Saugahatchee water monitors got some great news at their last group meeting in mid-October – funding from local government to support their ongoing water monitoring activities in the Saugahatchee Watershed! This was extremely welcome and important news on several fronts:

- SOS has very limited financial resources,
- given the ongoing rapid development, the Saugahatchee Watershed needs TLC now more than ever, and
- support by local governmental entities equates to them 'buying-in' to Alabama Water Watch's *Community-based Watershed Stewardship* model – a big boost for SOS monitoring and watershed stewardship efforts!

— Cliff Webber and Eric Reutebuch (on left, SOS board member and president) ceremoniously receive support for annual water monitoring supplies from Joey Hundley, Dan Ballard and Scott Parker (center and to the right, representing Lee County, City of Auburn and City of Opelika).

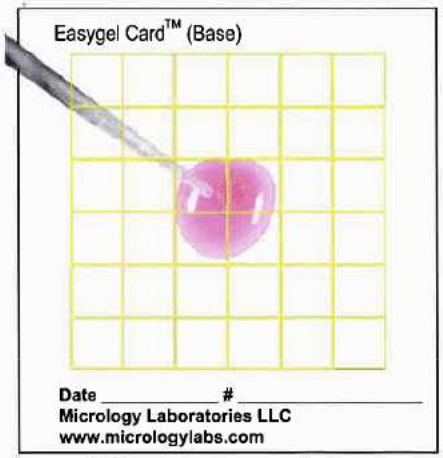
Since they value and utilize SOS water data, the City of Opelika, the City of Auburn, and Lee County have pledged support of local water monitoring efforts to the tune of $350 each, for a total of $1,050 per year. SOS volunteer monitors have been monitoring numerous sites in the Saugahatchee Watershed since 1997, and currently monitor 23 sites from Opelika to Reeltown (see map below).

- tracking contamination (sewage) of local waters,
- aiding in monitoring and tracking fish kills,
- monitoring industrial point source discharges,
- water monitoring used in implementation of ADEM-funded watershed management plans aimed at water quality improvement, and,
- municipal and county water monitoring required by ADEM's permitting of Phase II *Small Municipal Separate Storm Sewer Systems* (MS4s).

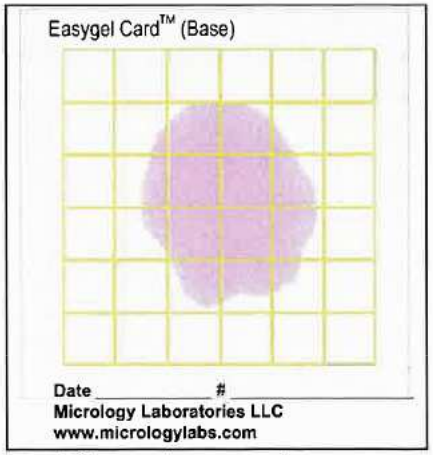
Check it out!

Introducing the Easygel Card™

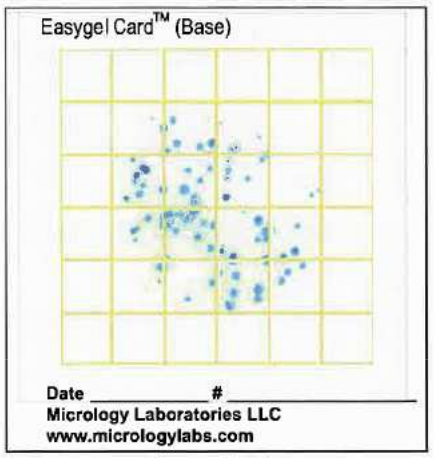
Patent Pending



Pipette sample on base card (color for visability)



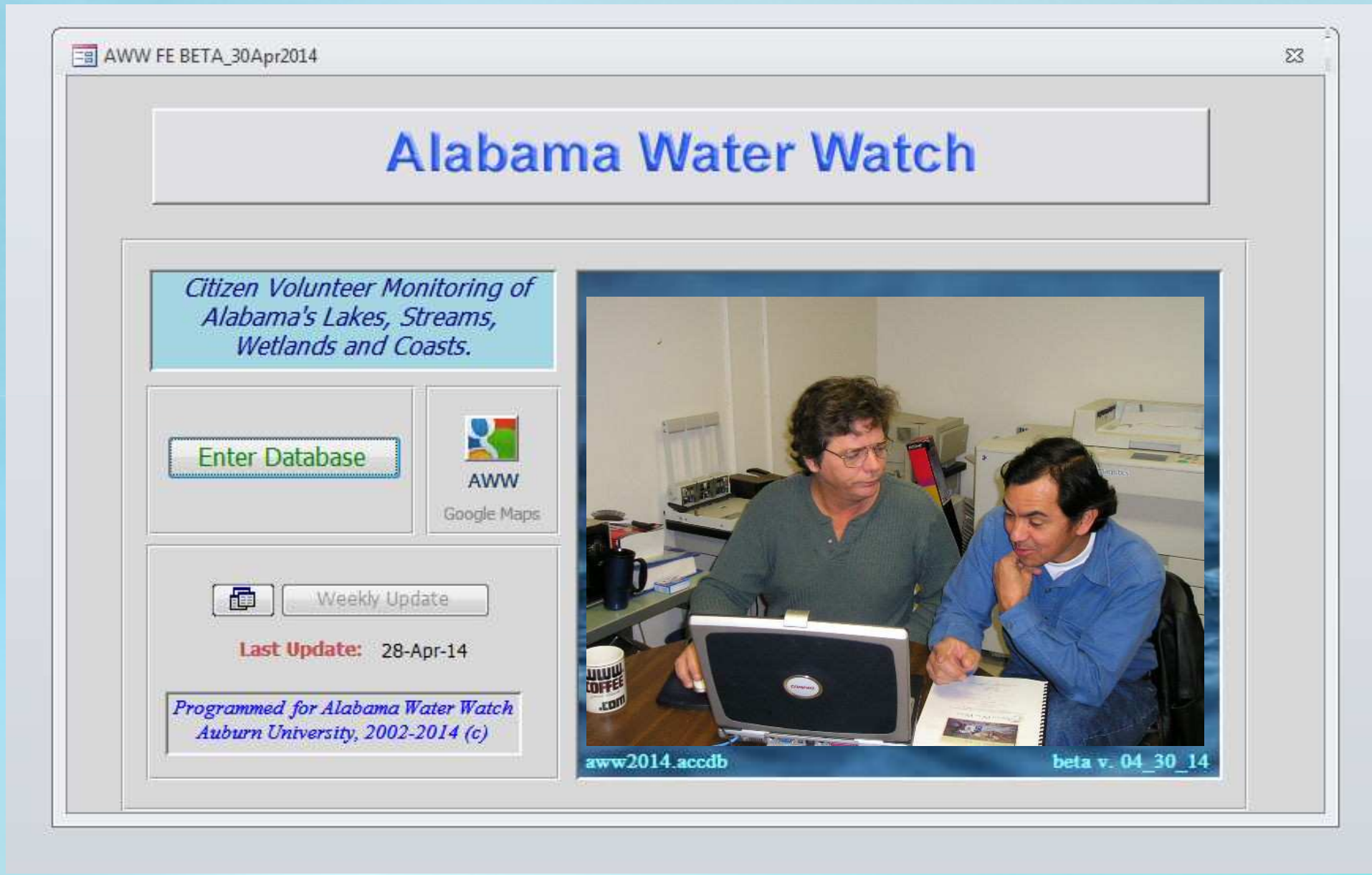
Place top card on



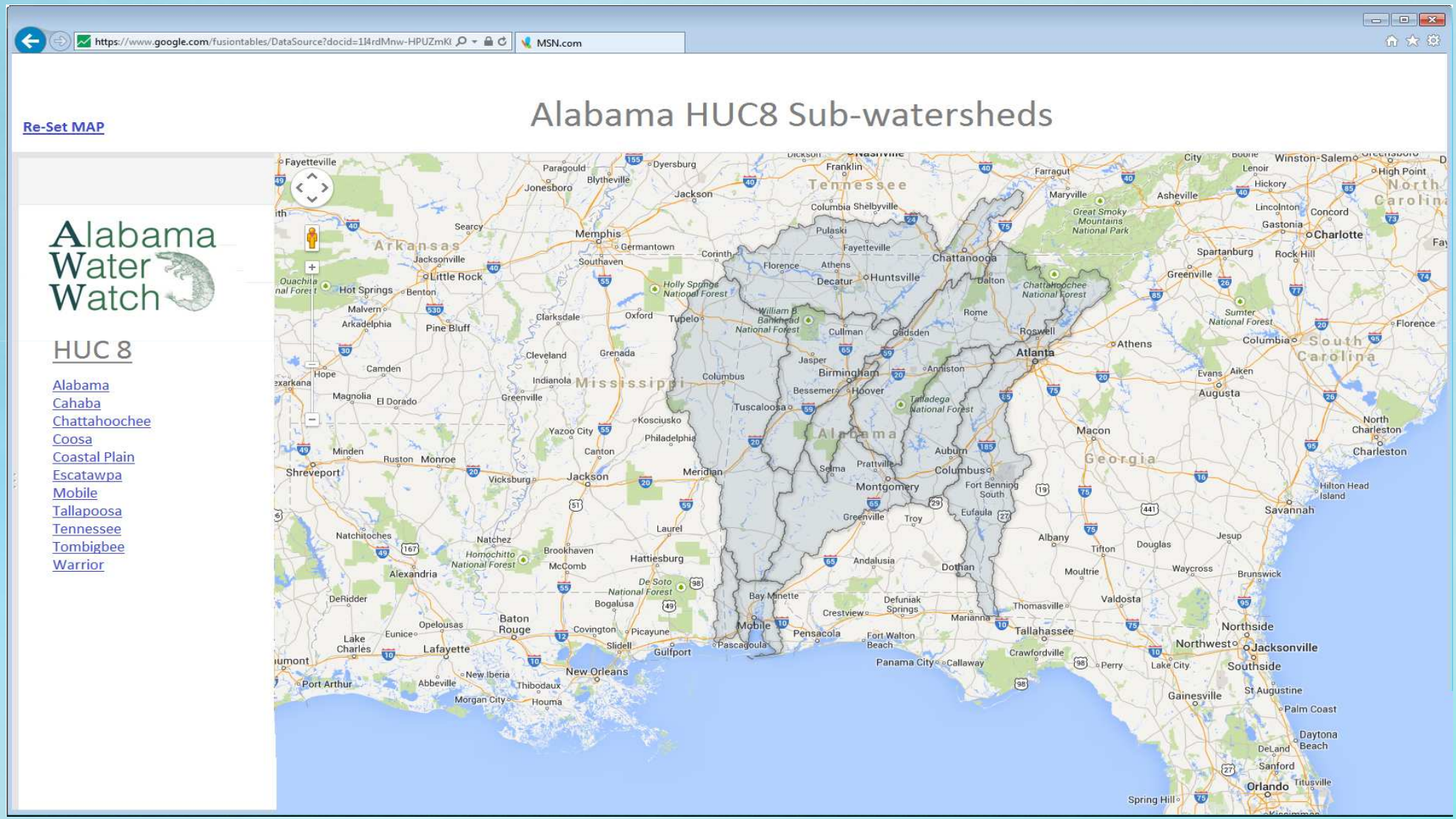
Incubate

Micrology Laboratories

AWW Program Highlights: New Database

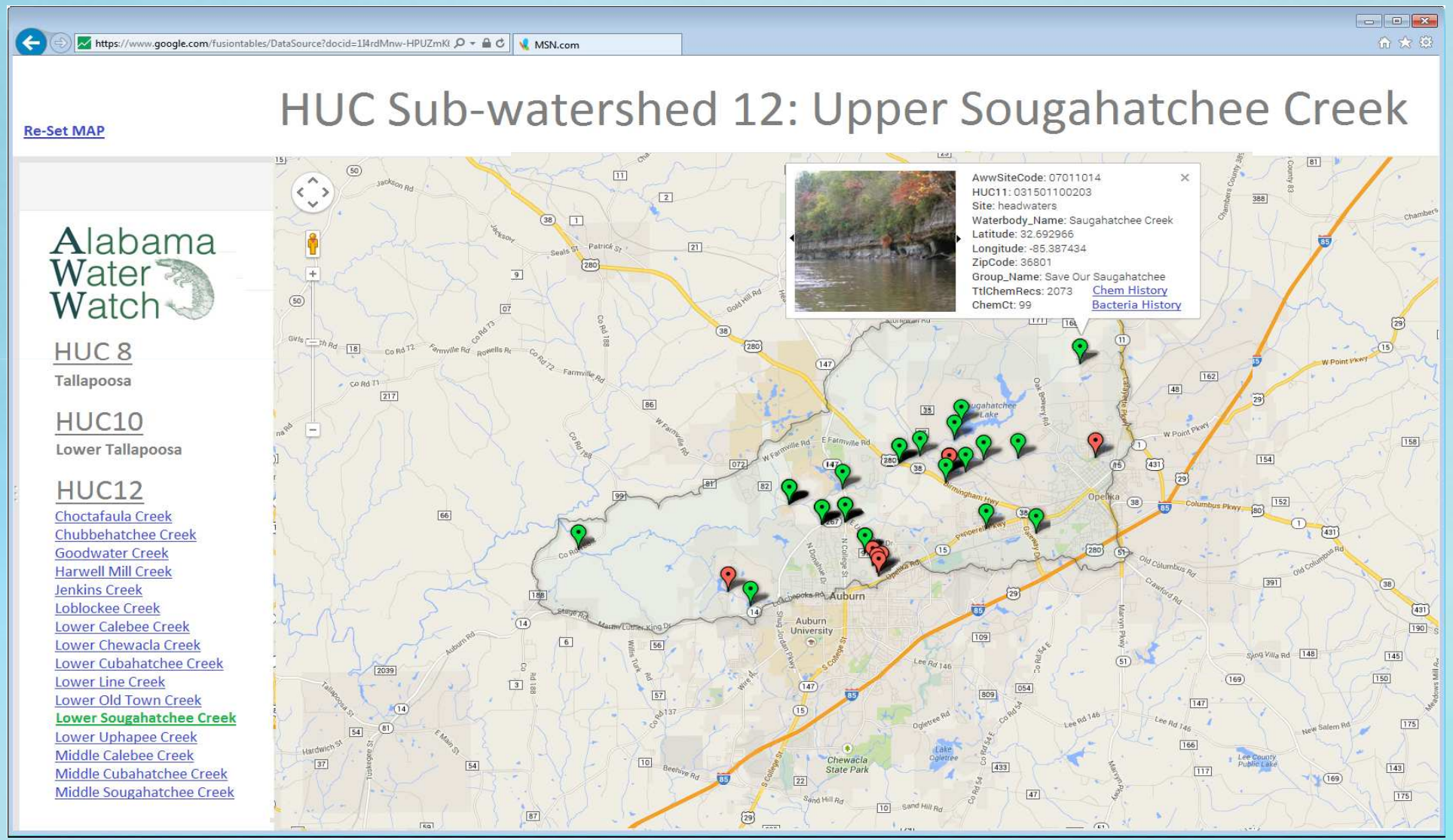


AWW Website Upgrade: HUC 08 Monitoring Site Selection

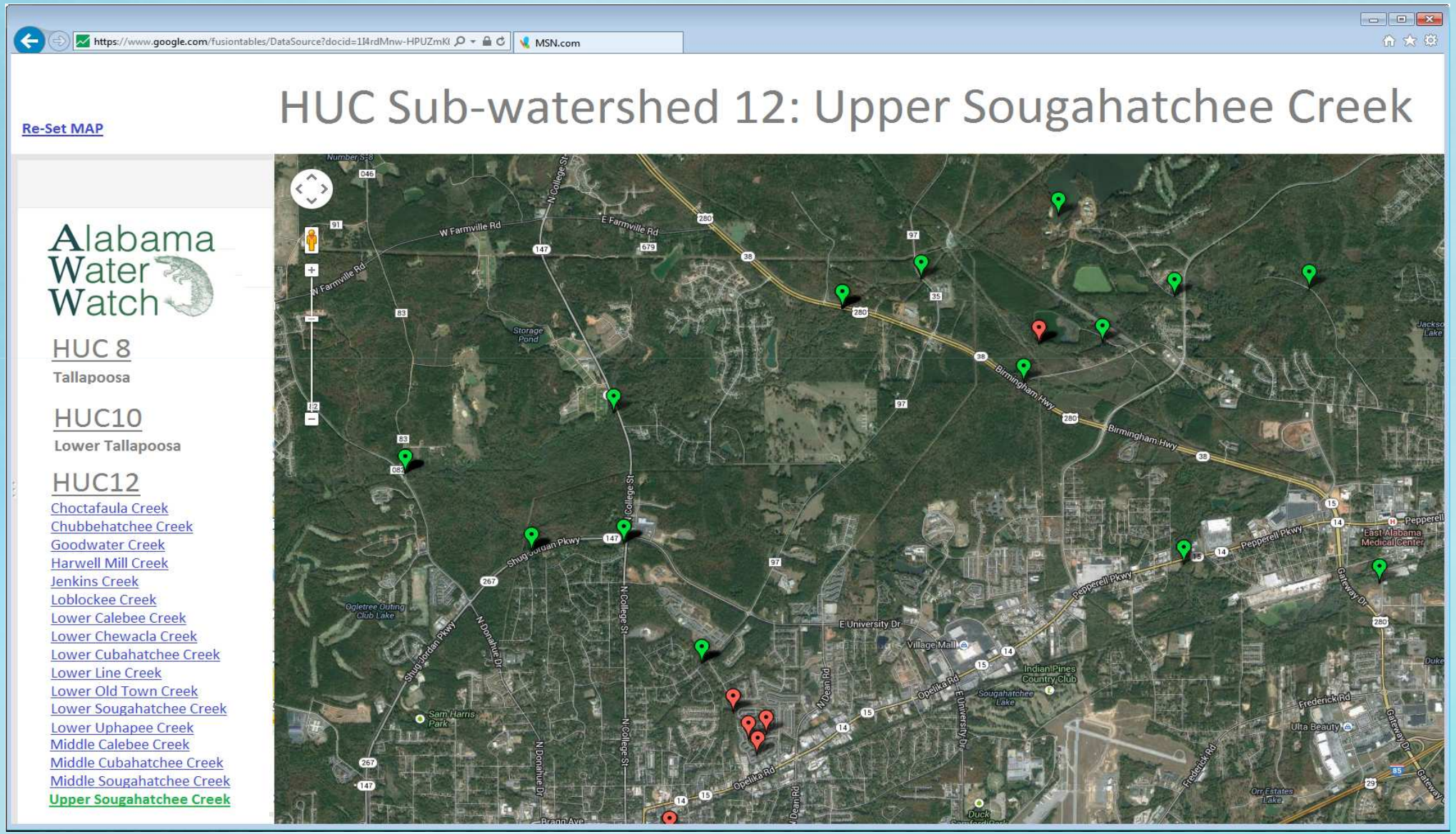


AWW Website Upgrade: Monitoring Sites inside a HUC 12

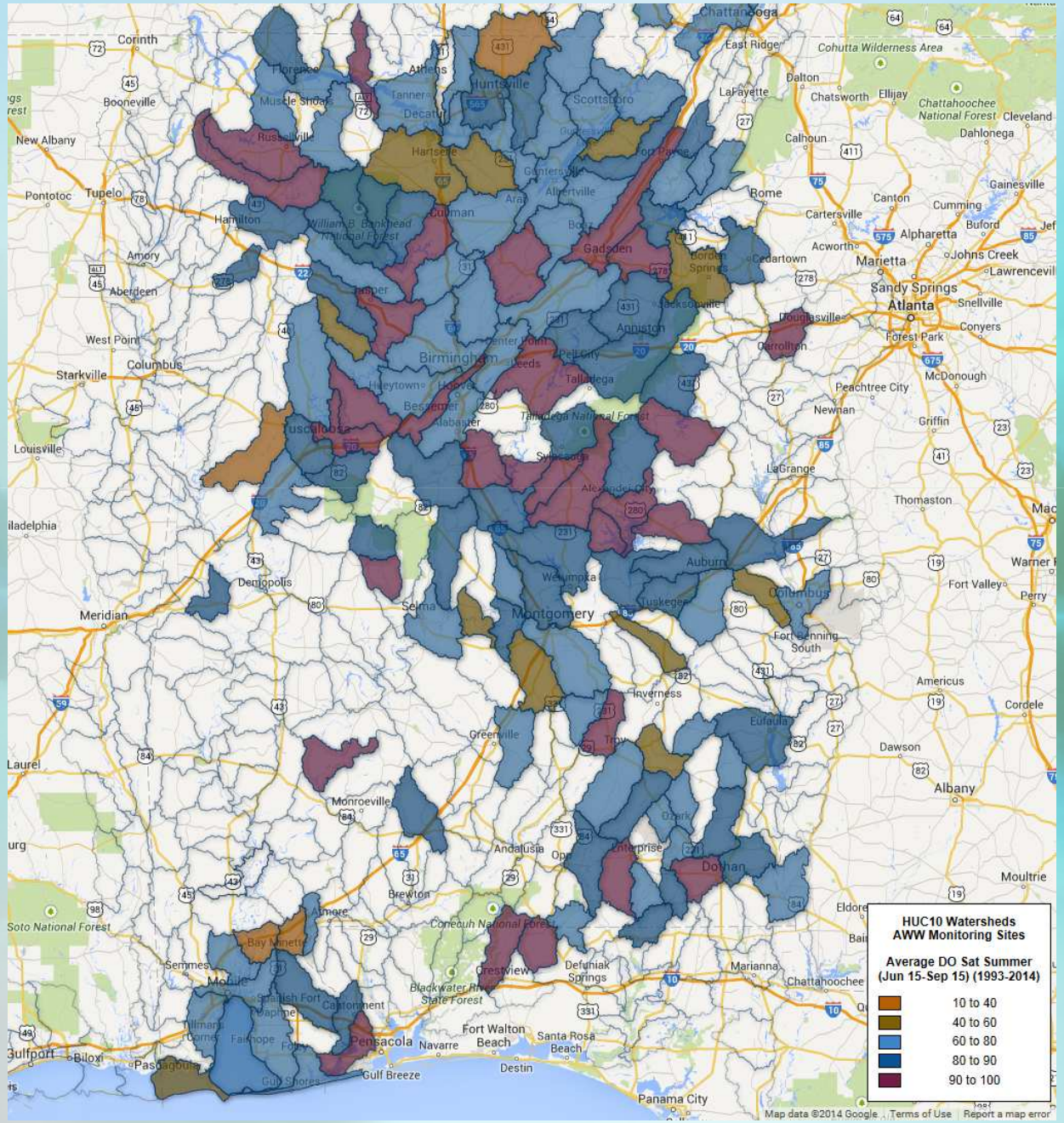
Monitoring Site info



AWW Website Upgrade: Monitoring Sites Satellite View

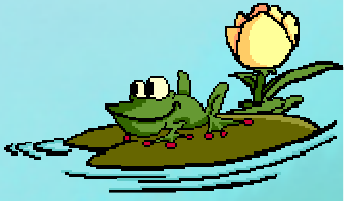


Query by Watershed!



Conclusion – AWW has made Alabama a Cleaner Place !

- Increased public awareness
- Monitoring public swim areas
- Sourcing/repairs to sewage leaks
- Improved land management
- Stream, river, lake and bay upgrades



Acknowledgements

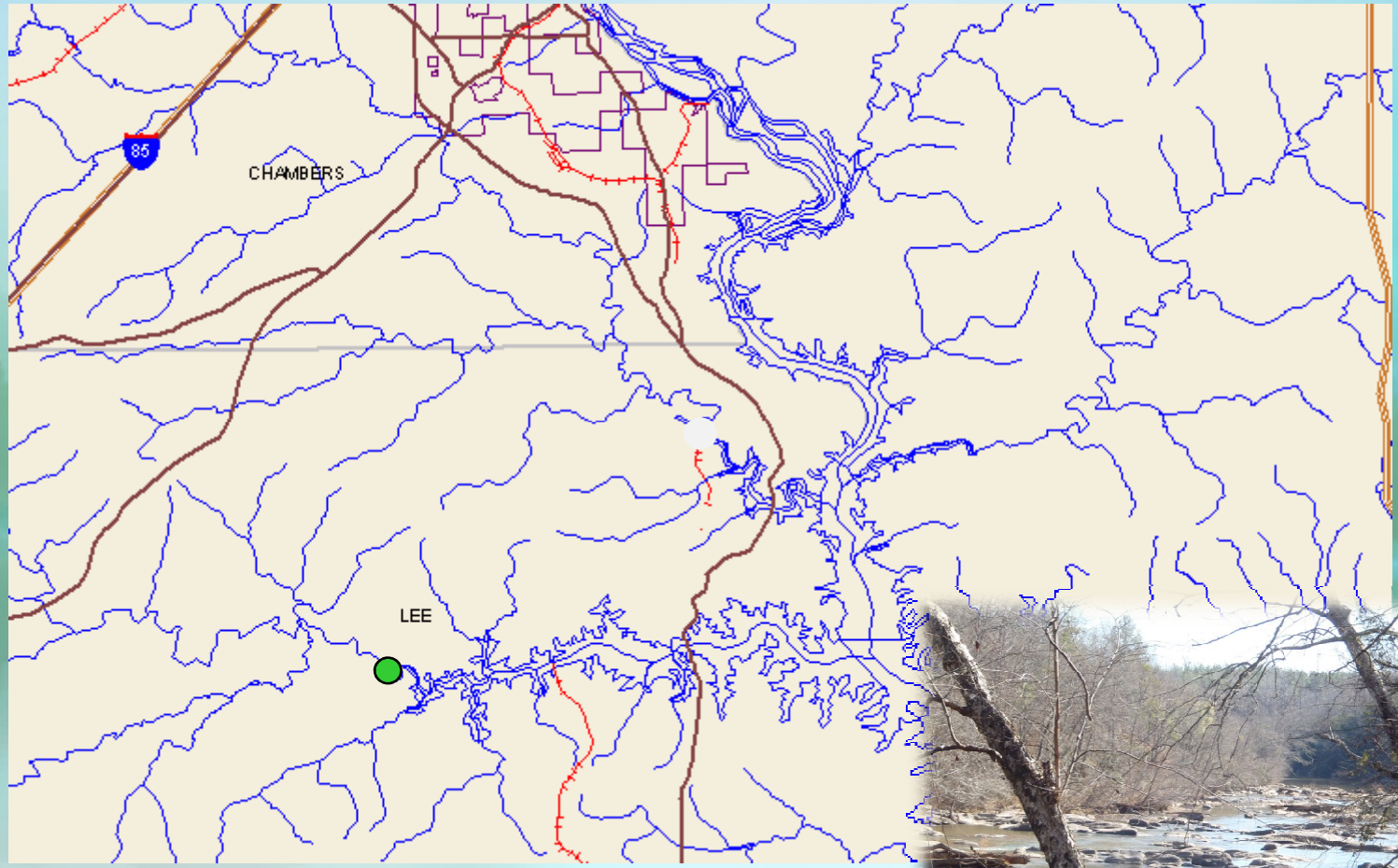
- AL Agricultural Experiment Station
- Alabama Cooperative Extension System
- Alabama Department of Environmental Management

** AWW Supporters:

Trainers, Monitors, Educators, Donors

Halawakee Creek at base of shoals

AWW Site: 03012014



Carl Badger – Friend of Halawakee Creek

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